MONTHLY REPORT

CONTRACT [redacted] 25X1

PAR 217

1 May 64

SUBJECT: Optimization of the Laser

TASK/PROBLEM

1. Explore the production of 0.5 micron (blue-green) laser radiation by harmonic doubling in KDP and ADP crystals.

KDP - Potassium Di-Hydrogen Phosphate

ADP - Ammonium Di-Hydrogen Phosphate

DISCUSSION

2. During the period, a 22-inch neodymium laser and a polished KPD crystal were set up in the laboratory to produce 5300 A radiation by optical second-harmonic generation. The KDP crystal was cut such that its surface normal made an angle of 41 degrees with the crystal optical axis, i.e., the angle calculated to produce the maximum intensity of second harmonic radiation.

3. Currently a photocell circuit is being designed to quantitatively measure and optimize this output. This circuit is being designed to produce either a steady d-c voltage proportional to the second-harmonic radiation output or a pulse that represents the output wave form.

4. Also, a visit was made to [redacted] to discuss the plasma pinch experiments of [redacted] in which he had a laser pump. This approach is interesting as it provides high intensity pumping in very narrow spectral wavelength regions as opposed to the more conventional black-body radiation pumping with flash tubes. The pinch pump has the advantage of reducing radiative heating of the laser rod. It is hoped that this technique in combination with harmonic doubling can produce 5300 A radiation at high repetition rate. 25X1 25X1

PLANNED ACTIVITY

5. Next period, we hope to start optimizing the output intensity of this second harmonic and to establish general alignment tolerance for maintaining this output. We do not intend to make any photographic exposures until this effort is completed.

GROUP-1
Excluded from automatic downgrading and declassification